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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ZAMAN, FAISAL M

ART UNIT	PAPER NUMBER
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2112

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/791,312		SRINIVASAN ET AL.	
	Examiner		Art Unit	
	Faisal Zaman		2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>See Continuation Sheet</u> . |

Continuation of Attachment(s) 6). Other: Examiner-cited non-patent literature.

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DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “memory to store data” (see Claim 1, line 5) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --INTELLIGENT PCI BRIDGING CONSISTING OF PREFETCHING ALL DATA PRIOR TO SENDING DATA TO REQUESTING DEVICE--.

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: there is no mention of an article of machine-readable code, as recited in Claims 21-28, in the specification.

4. The disclosure is objected to because of the following informalities:

Page 5, line 17, replace "32bytes" (missing space) with --32 bytes--.

Page 5, line 22, replace "scope of the invention" (missing period) with --scope of the invention.--.

Appropriate corrections are required.

Claim Objections

5. Claims 10, 13, 23, and 26 recite the limitation "the transmit size" in Claim 10, lines 5 and 7; Claim 13, line 1; Claim 23, lines 4 and 6; and Claim 26, line 1. There is insufficient antecedent basis for this limitation in the claims. The examiner would interpret this limitation, for examination purposes, to mean "the data size".

6. Claims 1 and 23 are objected to because of the following informalities:

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In Claim 1, line 9, replace "transmit read request" to --transmit **said** read request--.

In Claim 23, line 7, replace "data received in response" to --**transmit** data received in response--.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1, 3-9, 11, 12, 14, 16, and 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bronson et al. ("Bronson") (U.S. Patent No. 6,973,528), in view of Imperiali (U.S. Patent No. 6,463,483).

Regarding Claims 1 and 16, Bronson discloses a device (Bronson, Figure 2, item 200, Column 3, lines 54-60) comprising:

A first port (Bronson, Figure 2, item 118, Column 3, lines 29-32) to allow the device to communicate with other devices (Bronson, Figure 2, item 126 and Figure 3, item 204, Column 3, lines 32-33 and lines 54-60) on an expansion bus (Bronson, Figure 3, item 206, Column 3, lines 58-62);

A second port (Bronson, Figure 2, item 124, Column 3, lines 29-30) to allow the device to communicate with devices (Bronson, Figure 2, items 112 and 114, and Figure

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3, item 208, Column 3, lines 36-40 and lines 58-60) on a second bus (Bronson, Figure 3, item 210, Column 3, lines 60-62);

A memory to store data (Bronson, Figure 3, item 212, Column 4, lines 29-31);
and

A processing element (Bronson, Figure 3, item 214 with 216, Column 3, lines 62-64) to:

Receive a read request from an expansion device (Bronson, Figure 3, item 250, Column 4, lines 14-16) to a predetermined area of system memory (Bronson, Figure 3, item 208, and Figure 2, item 114, Column 4, lines 14-28);

Transmit read request to the system memory (Bronson, Figure 3, item 254, Column 4, lines 19-20);

Prefetch data from the system memory (Bronson, Column 4, lines 29-35).

Bronson does not expressly disclose the following limitations:

Receive descriptor data from the system memory; and

Parse the descriptor data from the system memory to determine a data size.

In the same field of endeavor (e.g. control of device buses in processor systems), Imperiali teaches:

Receiving descriptor data (Imperiali, Column 4, lines 13-20 and lines 36-42) from a system memory (Imperiali, Figure 2, items 12 and 14, Column 2, lines 64-66 and Column 3, lines 61-63); and

Parsing the descriptor data from the system memory to determine a data size (Imperiali, Column 4, lines 36-42).

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Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Imperiali's teachings of control of device buses in processor systems to the teachings of Bronson, for the purpose of increasing data throughput on the device bus (see Imperiali, Column 1, lines 26-27). Bronson also provides motivation to combine by stating it is an object of the invention to prevent data performance impacts when dealing with target devices that can only transfer data for a limited number of bytes before disconnecting (see Bronson, Column 2, lines 3-6).

Regarding Claim 3, Bronson teaches wherein the second bus further comprises a system bus (Bronson, Figure 2, Column 3, lines 24-29, ie. PCI bus 122 coupled to CPU 112 through Host bridge 120).

Regarding Claim 4, Bronson discloses wherein the second bus further comprises an expansion bus (Bronson, Column 3, lines 60-62, it is well known in the art that a PCI bus is a common type of expansion bus).

Regarding Claims 5-6 and 18-19, the examiner takes Official Notice that a device in the type of system disclosed is generally well-known in the art to comprise of a network device and/or an application specific integrated circuit, therefore it would be obvious to one of ordinary skill in the art to use a network device and/or an application specific integrated circuit as the device in the claimed invention.

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Regarding Claims 7 and 20, the examiner takes Official Notice that an expansion device in the type of system disclosed is generally well-known in the art to comprise of a network interface card, therefore it would be obvious to one of ordinary skill in the art to use a network interface card as the expansion device in the claimed invention.

Regarding Claim 8, all the same elements of Claim 1 are listed, but in method form rather than system form. Therefore, the supporting rationale of the rejection to Claim 1 applies equally as well to Claim 8.

Regarding Claim 9, all the same elements of Claim 2 are listed, but in method form rather than system form. Therefore, the supporting rationale of the rejection to Claim 2 applies equally as well to Claim 9.

Regarding Claim 11, Bronson discloses a method comprising disconnecting from the system memory once the data is received from the system memory (Bronson, Column 4, lines 38-46).

Regarding Claim 12, Bronson discloses a method comprising storing any prefetched data remaining for a read request if the expansion device disconnects (Bronson, Column 4, lines 56-64).

Regarding Claim 14, Bronson discloses a method comprising discarding any prefetched data not transmitted to expansion devices after a programmable amount of time (Bronson, Column 5, lines 8-17).

Claim Rejections - 35 USC § 103

9. **Claims 2, 10, 13, and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bronson-Imperiali as applied to Claim 1 above, in further view of Berry et al. ("Berry") (U.S. Patent No. 6,766,511).

Bronson-Imperiali discloses the invention substantially as claimed.

Bronson-Imperiali discloses the device of claim 1.

Regarding Claims 2 and 17, Bronson-Imperiali teaches a memory that comprises a storage (Imperiali, Figure 3, item 232 with item 232M and with item 224, Column 4, lines 13-15 and lines 36-40) in which to store packet addresses (Imperiali, Column 4, lines 13-20) and lengths (Imperiali, Column 4, lines 40-43, ie. "size of the data block") parsed from the descriptor data.

Bronson-Imperiali does not expressly disclose that the packet addresses and lengths are stored in a hash table.

In the same field of endeavor (e.g. storing data for executable modules), Berry teaches the use of a hash table for storing packet addresses and lengths (Berry, Column 26, lines 28-34).

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Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Berry's teachings of storing data for executable modules with the teachings of Bronson-Imperiali, for the purpose of having efficient access to information (ie. descriptor data) related to a data packet. Bronson-Imperiali also provides motivation to combine by stating it is an object of the invention to increase data throughput on the device bus (see Imperiali, Column 1, lines 26-27).

Regarding Claim 10, Bronson-Imperiali teaches receiving a read request from the expansion device (Bronson, Column 4, lines 14-16);

Identifying the address for the read as not belonging to a preconfigured area of a system memory (Imperiali, Column 4, lines 13-18);

Accessing the data size from the descriptor data found in a storage (Imperiali, Column 4, lines 56-65 and Column 5, lines 43-55);

Issuing a read request to the system memory (Imperiali, Column 5, lines 1-55, the TX complete signal is the read request signal), wherein the read request has a request size based upon the data size (Imperiali, Column 5, lines 32-55, the data size is known); and

Transmitting data received in response to the read request to the system memory to the expansion device (Imperiali, Column 5, lines 17-21).

Bronson-Imperiali does not expressly disclose that the data size is stored in a hash table.

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In the same field of endeavor, Berry teaches the use of a hash table for storing packet addresses and lengths (Berry, Column 26, lines 28-34).

The motivation used in the combination of Claim 2, super, applies equally as well to Claim 10.

Regarding Claim 13, Bronson-Imperiali teaches a method comprising accessing a storage within which are the descriptor data, including packet address and length (Imperiali, Column 4, lines 36-65).

Bronson-Imperiali does not expressly disclose that the packet addresses and lengths are stored in a hash table.

In the same field of endeavor, Berry teaches the use of a hash table for storing packet addresses and lengths (Berry, Column 26, lines 28-34).

The motivation used in the combination of Claim 2, super, applies equally as well to Claim 13.

Claim Rejections - 35 USC § 103

10. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bronson-Imperiali as applied to Claim 1 above, in further view of Ong (U.S. Patent No. 5,815,662).

Bronson-Imperiali discloses the invention substantially as claimed.

Bronson-Imperiali discloses the method of claim 9.

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Bronson-Imperiali does not expressly disclose the method further comprising:

Determining that the memory to store descriptors is full; and

Discarding an oldest descriptor entry.

In the same field of endeavor (e.g. scheduling of sending data across a network),

Ong discloses a method comprising:

Determining that the memory to store descriptors is full (Ong, Figure 2, item 30, Column 4, lines 22-24); and

Discarding an oldest descriptor entry (Ong, Figure 2, item 30, Column 4, lines 22-24).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Ong's teachings of scheduling of sending data across a network with the teachings of Bronson-Imperiali, for the purpose of minimizing unnecessary repetitive accesses to data storage devices (see Ong, Column 2, lines 23-27). Bronson-Imperiali also provides motivation to combine by stating it is an object of the invention to prevent data performance impacts when dealing with target devices that can only transfer data for a limited number of bytes before disconnecting (see Bronson, Column 2, lines 3-6).

Claims 21-28 are directed to an article of machine-readable code of the method of Claims 8-15. Bronson, Imperiali, Berry, and Ong teach, either alone or in combination as stated above, the method as set forth in Claims 8-15. Therefore,

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Bronson, Imperiali, Berry, and Ong also teach, either alone or in combination as stated above, the article of machine-readable code as set forth in Claims 21-28.

Prior Art of Record

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Andrade et al. (U.S. Patent No. 5,649,161) discloses prepaging during PCI master initiated wait cycles. Shigeeda (U.S. Patent No. 5,737,765) discloses an electronic system with circuitry enabling access to configuration registers used by a memory controller. Gillespie et al. (U.S. Patent No. 5,913,045) discloses a programmable PCI interrupt routing mechanism. MacLaren (U.S. Patent No. 6,075,929) discloses prefetching data in response to a read transaction for which the requesting device relinquishes control of the data bus while awaiting data requested in the transaction. Batchelor et al. (U.S. Patent No. 6,286,074) discloses a method and system for reading prefetched data across a bridge system. Webber (U.S. Patent Publication No. 2003/0051076) discloses methods and a system for pre-fetching descriptors. Buckland et al. (U.S. Patent No. 6,665,753) discloses performance enhancement implementation through buffer management/bridge settings. Perez (U.S. Patent No. 6,820,161) discloses a mechanism for allowing PCI-PCI bridges to cache data without any coherency side effects. Easwar et al. (U.S. Patent No. 6,934,417) discloses determining if a memory is full and discarding an oldest entry in the case it is. Rosenberg ("Dictionary of Computers, Information Processing & Telecommunications")

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discloses a definition (2) of hashing, which was used for the rejections in this Office Action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faisal Zaman whose telephone number is 571-272-6495. The examiner can normally be reached on Monday thru Friday, 9 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rehana Perveen can be reached on 571-272-3676. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

fmz

Kishor Dong
Primary Examiner